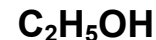


40A Ethanol (IDA)



Schools and colleges usually buy Industrial Denatured Alcohol (IDA) but label it 'ethanol' (pure ethanol is very expensive). IDA is the accepted name for what we used to call Industrial Methylated Spirits (IMS). It consists of ethanol, a little water and 5% methanol which results in the harmful classification. Completely denatured alcohol (CDA) (formally Mineralised Methylated Spirits) contains pyridine (harmful), a chemical with an obnoxious odour, as well as a purple dye. This is not suitable for most uses in laboratories.

Highly flammable		R11: Highly flammable. R22: Harmful if swallowed. WEL (mg m⁻³): 1920 (LTEL), 5760 (STEL).
Harmful (<i>indicating the presence of methanol</i>)		Flash point: 13 °C. There is a danger of very serious irreversible effects through inhalation, in contact with skin and if swallowed. Hence, IDA is more poisonous than ethanol and CDA is even more so. Methanol should not be substituted for ethanol in spirit duplicators or chemical reactions.

The substance is dangerous with:	BROMINE. Violent reaction may occur. MERCURY(II) and SILVER NITRATE(V). Explosive fulminates may be formed. OXIDISING AGENTS. Uncontrollable reactions take place especially with NITRIC(V) ACID. PLATINUM. Finely-divided platinum (eg, platinised electrodes, catalysts) may cause ethanol to burst into flame. POTASSIUM. An explosive reaction may occur.
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Emergencies: see standard procedures on *Hazard E*, BUT ALSO:

If swallowed:	Seek medical attention if victim shows symptoms of intoxication.
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Store: FL The bulk supply should be under lock and key. You need to keep records of the volume that your school orders and uses but this will normally be covered by good stocktaking. When purchasing IDA, the school will need to provide the supplier with the reference number it has received from HM Revenue & Customs (HMRC). If, however, the school address or the volume to be ordered changes, HMRC will need to be informed. Reference numbers obtained before 2005 are still valid. If you need to reapply, download Notice 473 from the HMRC web site. This is best obtained by typing 'Notice 473' into a search engine or using the link on the CLEAPSS web site.	Disposal: W1, W7 W7: Dilute to a 5% (v/v) solution before pouring it down a foul-water drain.
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Activity	User	Control measures	Experimental points
Evaporation and cooling	Y7	-	Surgical spirits BP contains ethanol and is safe to apply to the hand so that the cooling effect can be experienced.
Any activity involving heating	Y7	Wear eye protection. Never use a naked flame to heat a highly flammable liquid.	If no electrically-heated bath is available, half-fill a beaker with boiling water from a kettle. This will provide enough heat to boil the ethanol in a test tube or smaller beaker. If ethanol vapour in a container catches fire, cover the container with a heat-proof mat or a damp cloth.
Extracting pigments from plants	Y7	Wear eye protection. Never use a naked flame to heat a highly flammable liquid.	Eg, chlorophyll. Use the method above but replace hot water in the bath after 5 minutes. Students in Y12 and above could use reflux equipment heated on a boiling-water bath.
As a fuel	Y7	Wear eye protection. Pupils should not fill or refill crucibles or spirit burners.	If small open crucibles are used, they should be placed on a heat-proof mat. Spirit burners for ethanol should not be used with any other fuel. Make sure the wick fits tightly in the holder and the holder fits tightly in the container. See L195, <i>Safer Chemicals, Safer Procedures</i> .
Preparation of ethene	Y9	Wear eye protection. Once enough gas has been collected, the apparatus should be raised out of the water to prevent suck back.	The apparatus used is the same as that for the catalytic cracking of hydrocarbons. Use mineral wool to absorb about 10 cm ³ of ethanol/IDA in a boiling tube. The catalyst can be aluminium oxide, brick or broken unglazed porcelain. Heat the catalyst strongly before warming the ethanol. The gas is collected over water. See <i>Handbook</i> 13.2.
Making esters	Y9	Wear eye protection.	See <i>Hazard</i> 38A.
Oxidation (test-tube scale)	Y9	Wear eye protection.	The reagents used are either acidified potassium dichromate(VI) or potassium manganate(VII). Add the reagents slowly, with stirring, to prevent the reaction becoming too violent. The contents sometimes 'spit out' so position the test tube safely.
Reaction with sodium	Y12	Wear eye protection.	Use an excess of ethanol and pieces of sodium about 2 mm each side. Do not add potassium to ethanol.
Ethanol gun	TT	Wear eye protection. Arrange pupils so that they are not in the firing line.	A 500 cm ³ plastic bottle is used. The cork or bung can travel the length of the laboratory. Do not exceed the stated amounts. See <i>Classic Chemical Demonstrations</i> , RSC, ISBN 1870343387.
'Burning' a £5 note	TT	Wear eye protection.	A 50% (v/v) solution of aqueous ethanol is used. Keep the solution well away from the burning note.